Deng 113556

IN THE CLAIMS:

1. (Original) A communication network that includes nodes and link bundles that interconnect said nodes, where said link bundles are carried over physical spans of transmission facilities, the improvement in each of said nodes comprising:

a processing module that determines, with respect to each link bundle to which the node of said processing module is connected, whether said node of said processing module is

a control node, where a control node is a node that triggers rerouting in response to a failure indication associated with said link bundle, or

is a backup node, where a backup node is a node that triggers rerouting in response to a failure indication associated with said link bundle when said control node is unresponsive.

C1

2. (Original) The network of claim 1 where each of said nodes further comprises a communication module that receives status information from nodes connected to said each of said nodes and rebroadcasts said status information to nodes connected to said each node.

3. (Original) The network of claim 1 where each of said nodes further comprises a communication module that is adapted to receive status information from all nodes connected to said each of said nodes, and rebroadcasts said status information to said all nodes, except to the node connected to said each of said nodes from which said status information is received.

4. (Original) The network of claim 1 where each of said nodes further comprises a communication module that receives status information from nodes connected to said each of said nodes and rebroadcasts said status information to a computable set of nodes connected to said each node.

5. (Previously Presented) A communication network that includes nodes N_p, p=1, 2, 3..., and link bundles L_{pq}, q=1, 2, 3..., that interconnect nodes p and q, where said

link bundles are carried over physical spans of transmission facilities, the improvement comprising:

a neighborhood M_p associated with each node N_p, where neighborhood M_p may be different in size from neighborhood M_q, where size of a neighborhood designates number of hops included in the neighborhood; and

node N_p comprises a processing module that receives information about spare capacity in neighborhood M_p and maintains a set of re-route plans that affect neighborhood M_p, or pointers to such plans.

Cl Cont.

6. (Original) The network of claim **5** wherein said re-route plans of node N_p involve re-routing of paths between a node N_j in neighborhood M_p and a node N_k in neighborhood M_p.

7. (Original) The network of claim **5** wherein said processing module in node N_p initiates a re-route plans creation process whenever it receives information about a change in resource availability in neighborhood M_p that leads said processing module to conclude the a recreation of re-route plans is in order.

8. (Original) The network of claim **7** wherein said information indicates an increase in spare capacity, or a decrease in spare capacity.

9. (Original) The network of claim **7** wherein said information indicates a decrease in spare capacity because of a failure in an element within its neighborhood.

10. (Original) The network of claim **5** wherein said processing module, upon receiving information of a failure condition of a type for which node N_p is a control node for purposes of re-routing, triggers execution of a pre-planned re-routing plan to bypass said failure condition.

11. (Original) The network of claim **5** wherein said processing module, upon receiving information of a failure condition of a type for which node N_p is a backup node

for purposes of re-routing, triggers execution of a pre-planned re-routing plan to bypass said failure condition when, in response to a query of a node N_q that is a control node for said failure condition, node N_p determines that node N_q will not trigger said execution of said pre-planned re-routing plan.

12. (Original) The network of claim **11** wherein said triggering comprises transmitting a re-route plan to each node in neighborhood M_p that is involved in a re-routing to bypass said failure condition.

Cl Cont.

13. (Original) The network of claim **11** wherein said triggering comprises transmitting a pointer for triggering execution of a re-route plan.

14. (Original) The network of claim **11** wherein said triggering comprises broadcasting a pointer for triggering execution of a re-route plan.

15. (Original) The network of claim **5** wherein said node N_p transmits each of the re-route plans that is developed as part of the re-route plans creation process to nodes in its neighborhood that are involved in said each of said re-route plans.

16. (Original) The network of claim **15** wherein a plan ID pointer is included in each of the transmitted re-route plans.

17. (Currently Amended) Apparatus including a plurality of ports, a cross-connect element coupled to said ports, and a control elements for effecting a path through said cross-connect element from a first port of said plurality of ports to a second port of said plurality of ports, the improvement comprising:

a processing module that determines, with respect to each of said ports, whether said apparatus is a control node that triggers rerouting in response to a failure indication associated with said ports, or is a backup node that triggers rerouting in response to a failure indication associated with said ports only when another apparatus is unresponsive.

Deng 113556

18. (Previously Presented) The apparatus of claim 17 wherein said processing module is also designed to receive status information that includes spare capacity information from other apparatus that is structurally the same as the apparatus of claim 17 and that is connected to said apparatus via said ports.

19. (Previously Presented) The apparatus of claim 17 wherein said processing module is designed to receive status change information from other apparatus that is structurally the same as the apparatus of claim 17 that is connected to said apparatus via said ports, and broadcasts the received status change information to said ports.

Cont.

20. (Previously Presented) The apparatus of claim 19 wherein said processing module broadcasts said status change information received via a first port to a computable set of said ports of said apparatus.

21. (Original) The apparatus of claim 19 wherein said processing module broadcasts said status change information received via a first port to all other of said ports of said apparatus, other than to said first port.

22. (Original) The apparatus of claim 19 wherein said processing module receives status change information with a rebroadcast index, and rebroadcasts said status change information following an incrementing of said rebroadcast index.

23. (Original) The apparatus of claim 19 wherein said communication module receives status change information with a rebroadcast index, and rebroadcasts said status change information, with said rebroadcast index incremented, but only if said rebroadcast index is less than a preselected value.

24. (Original) The apparatus of claim 19 where said communication module also acts in response to said status change information.

Deng 113556

25. (Original) The apparatus of claim **24** where said communication module acts in response to said status change information by initiating a re-routing pre-planning process when said communication module deems it advisable to account for said status change information.

26. (Original) The apparatus of claim **25** where said processing module generates a set of re-routing plans for those failures for which said apparatus is a control node.

Cl Cont.

27. (Original) The apparatus of claim **26** wherein said processing module transmits each of the re-routing plans that it generates to specifically addressed other apparatus.

28. (Original) The apparatus of claim **26** wherein said processing module transmits the set of re-routing plans that it generates for a given failure to at least an apparatus that is designated at the backup apparatus for said given failure.

29. (Original) A method carried out at a network node comprising the steps of:

receiving a message indicative of a change in resources at another node, said message including information regarding number of node hops through which said message arrived at said network node;

when said information denotes that said number of hops is less that a preselected number, broadcasting said message to other nodes.

30. (Original) The method of claim **29** further comprising the steps of

determining whether said message calls for a recreation of re-routing plans, and

initiating a process for creating re-routing plans when said step of determining indicates it advisable.

Deng 113556

31. (Original) The method of claim **30** further comprising a step of transmitting said re-routing plans, upon their completion in said process for creating, to nodes that are involved in execution of said re-routing plans.

32. (Original) The method of claim **31** further comprising the step of directing said nodes that are involved in execution of a particular one of said re-routing plans when said network node detects a failure that calls for said particular one of said re-routing plans to be put into effect.

33. (Original) The method of claim **30** further comprising a step of transmitting each of said re-routing plans, upon completion in said process for creating, to respective backup nodes of said re-routing plans, while also keeping said re-routing plans in local storage.

34. (Original) The method of claim **33** further comprising a step, responsive to said network node receiving information of a particular failure, of transmitting a re-route plan responsive to said particular failure, to nodes that are involved in execution of the transmitted re-route plan.

35. (Previously Presented) A communication network that includes nodes and link bundles that interconnect said nodes, where said link bundles are carried over physical spans of transmission facilities, the improvement in each of said nodes comprising:

a processing module that determines, with respect to each link bundle to which the node of said processing module is connected, whether said node of said processing module is adapted to be either

a control node, where a control node is a node that triggers rerouting in response to a failure indication associated with said link bundle, or

is a backup node, where a backup node is a node that triggers rerouting in response to a failure indication associated with said link bundle when said control node is unresponsive.

Deng 113556

36. (Currently AMended) A communication network under control of a single entity that includes nodes and link bundles that interconnect said nodes, where said link bundles are carried over physical spans of transmission facilities, the improvement comprising:

said node ~~being~~ includes information that imparts a partitioning of said network into a plurality of neighborhoods, at least some of the neighborhoods including more than one hop, with means in said nodes that allow traffic at a failed point in the network, which point is also at a given neighborhood, to be rerouted solely ~~my~~ by changes in paths within said given neighborhood.

Cont.

37. (Previously Presented) The network of claim 36 where said neighborhoods partially overlap each other.

38. (Previously Presented) The network of claim 36 where responsibility for recovering from failures at points of said network is assigned to different nodes of said network.

39. (Previously Presented) The network of claim 36 where responsibility for recovering from failures at points of said network is distributed to different nodes of said network.

40. (Previously Presented) The network of claim 36 where responsibility for each of a set of failure points of said network is assigned, for recovery purposes, to a one node of said network as a control node, and to a different node of said network as a backup node.

41. (Previously Presented) The network of claim 40 where each node that is a control node is adapted to direct nodes in its neighborhood to reroute traffic in case of a detected failure.

Deng 113556

42. (Previously Presented) The network of claim 40 where each node that is a backup node is adapted to direct nodes that are in the neighborhood of its associated control node to reroute traffic in case of a detected failure, and a condition wherein its associated control node is unable to reroute traffic.

C 11 Cont.

43. (Previously Presented) The network of claim 36, where a control node that is responsible for each neighborhood creates a re-routing plan for failures that might occur is its neighborhood.

44. (Previously Presented) The network of claim 43 where said control node directs nodes in its neighborhood to re-route traffic, in accord with a re-routing plan previously created by said control node, when a failure is detected.

45. (Previously Presented) The network of claim 43 where said re-routing plan comprises a set of subject-node re-routing plans and control node transmit each of said subject-node re-routing plans to node in the neighborhood of said control node that corresponds to said subject-node re-routing plan.

46. (Previously Presented) The network of claim 44 where said control node, when a failure is detected, directs nodes in its neighborhood to execute re-routing in accord with a re-routing plan previously transmitted to said nodes.